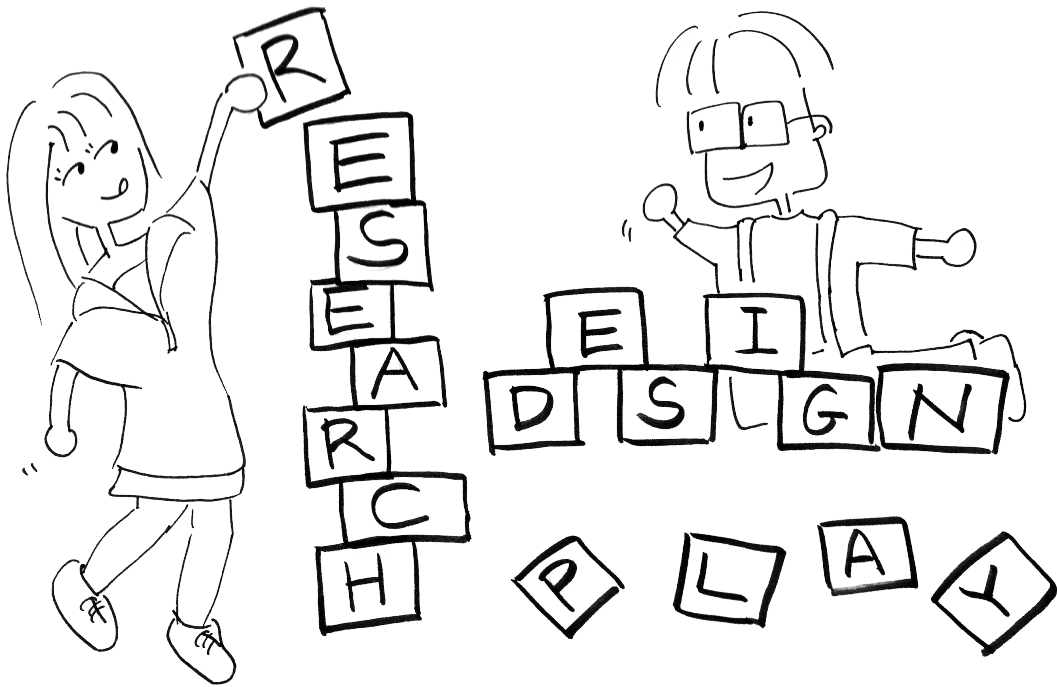


Research as design



Artwork by Jeffrey Chang

Resource packet

researchasdesign@gmail.com



Check this out — It's the Research as design resource packet.

This compilation is intended as an active toolkit to support your research process by introducing the design thinking elements. The guide is not just to read – go out in the world and try these tools yourself. In the following pages, we first outline each mode of a human-centered design process, and then describe some specific methods that can be introduced in your research process. These process modes and methods provide a tangible toolkit which support the seven mindsets — shown on the following page – that are vital attitudes for a design thinker to hold. At the end you will find several worksheets used during the Research as design workshop.

The resource packet is based on the d.school bootleg document, which captures some of the teaching from the “design thinking bootcamp,” our foundation course. We have also added some elements that are specific to the research process to help you enrich your research journey. The methods presented in this guide are culled from a wide range of people and organizations who have helped us build the content we use to impart design thinking. We thank all the people who have contributed to the methods collected in this guide.

This resource is free for you to use and share – and we hope you do. We only ask that you respect the Creative Commons license (attribution, non-commercial use). The work is licensed under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-sa/3.0/>

We welcome your reactions to this guide. Please share the stories of how you use it in the field. Let us know what you find useful, and what methods you have created yourself – write to:
researchasdesign@gmail.com

Cheers,
Research as design team

About the Research as design workshop

“Play with your research. Because research is too important to be taken seriously!” - Amanda Cravens

We have developed a series of workshops that introduce interdisciplinary graduate students to how design thinking may be used to better design their research. This workshop focuses on design methodologies specifically adapted for generating research ideas and designs in more creative ways. The workshop starts from the premise that while there are similarities and differences between design and research as ways of thinking, many of the tools and methods developed for design in other contexts can be fruitfully transferred and applied in the process of designing and conducting academic research. Five main areas of focus include:

- (1) problem finding and framing
- (2) multi-disciplinary team building
- (3) ideation/brainstorming
- (4) prototyping/testing and
- (5) storytelling.

Students come away with a new perspective on “doing research” as a creative endeavor as well as an analytical one.

Our full day workshop is an experiential "learning by doing" chance to explore the similarities and tensions between design thinking and analytic research. The workshop begins by mapping elements of the design cycle to the research processes students are familiar with, and drawing out differences that exist in research traditions across disciplines. We then introduce and practice concrete methods, tools, and exercises to allow students to play with their research and encourage out-of-the box thinking and creativity. Students also leave the workshop with a resource packet of methods and tools that serves as a reminder of what they did and a reference for when they are stuck in their research in the future and want inspiration for using design thinking to innovate out of the obstacles .

The workshop (intended to run approximately quarterly, 4 total over the 2011-2012 school year) is open to all research students (PhD or masters level) and post-docs at Stanford, though we will specifically target those in interdisciplinary graduate programs.

About the Research as Design team

Marilyn Cornelius is a 4th year PhD student in E-IPER and a Stanford Interdisciplinary Graduate Fellow. She studies residential energy use reduction through the lenses of design and behavioral science. She has applied design in an experimental setting and is now applying it as part of a hybrid ethnographic methodology for studying barriers and innovations in energy use reductions. She has taken a couple of design classes and is co-teaching a design class in Spring 2011 (ME/ENVRES 380: Collaborating with the future: launching large-scale sustainable transformations).

Amanda Cravens is a 2nd year PhD E-IPER student whose research focuses on designing and evaluating visualization software to support collaborative environmental decision-making and conflict resolution processes. She was introduced to user-center design methods in a previous life as an information architect and web designer. At Stanford, she has enjoyed a software-focused d.school class (Liberation Technologies) as well as the SGSI Adventures in Design Thinking. In her dissertation, she hopes to use design thinking as one theme to knit together software design, facilitation practice and meeting design, and research design.

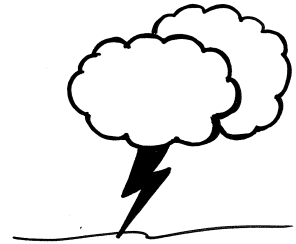
Nicola Ulibarri is a 1st year PhD E-IPER student, a Stanford Graduate Fellow and National Science Foundation Fellow. Her research is on drought planning and management in the southwestern US. She is also interested in reconceptualizing policymaking as a design process. She took the d.school's bootcamp class in Autumn 2010.

Adam Royalty is the Lead Research Investigator at the Hasso Plattner Institute of Design (d.school). Prior to this role he helped found the d.school's Environments Collaborative and K-12 Lab. Besides designing tools that allow people to gain confidence in their creative thinking, he works as part of REDlab in the Stanford School of Education to understand the impact of design thinking. Using quantitative and qualitative methods learned through his degrees in Math and Education Adam started the d.school Measurement and Assessment projects that aims to map the impact design thinking has on peoples creative potential.

Anja Svetina Nabergoj is Assistant professor at University of Ljubljana, Faculty of Economics, where teaches design thinking and entrepreneurship courses. Her PhD research was on collective learning and innovation. Recently her research is focusing on the impact of integrating design thinking into entrepreneurship curriculum. She has been visiting at Hasso Plattner Institute of Design since March 2010.

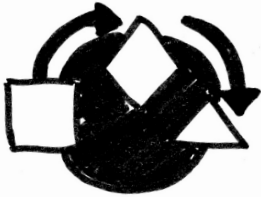
Show Don't Tell

Communicate your vision in an impactful and meaningful way by creating experiences, using illustrative visuals, and telling good stories.



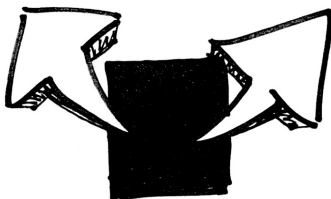
Focus on Human Values

Empathy for the people you are designing for and feedback from these users is fundamental to good design.



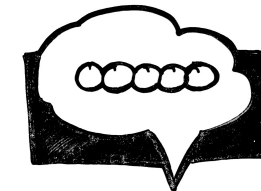
Embrace Experimentation

Prototyping is not simply a way to validate your idea; it is an integral part of your innovation process. We build to think and learn.



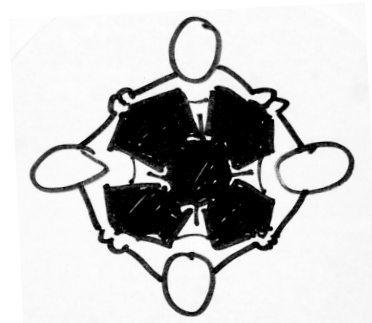
Bias Toward Action

Design thinking is a misnomer; it is more about doing that thinking. Bias toward doing and making over thinking and meeting.



Be Mindful Of Process

Know where you are in the design process, what methods to use in that stage, and what your goals are.



Radical Collaboration

Bring together innovators with varied backgrounds and viewpoints. Enable breakthrough insights and solutions to emerge from the diversity.

d.mindsets

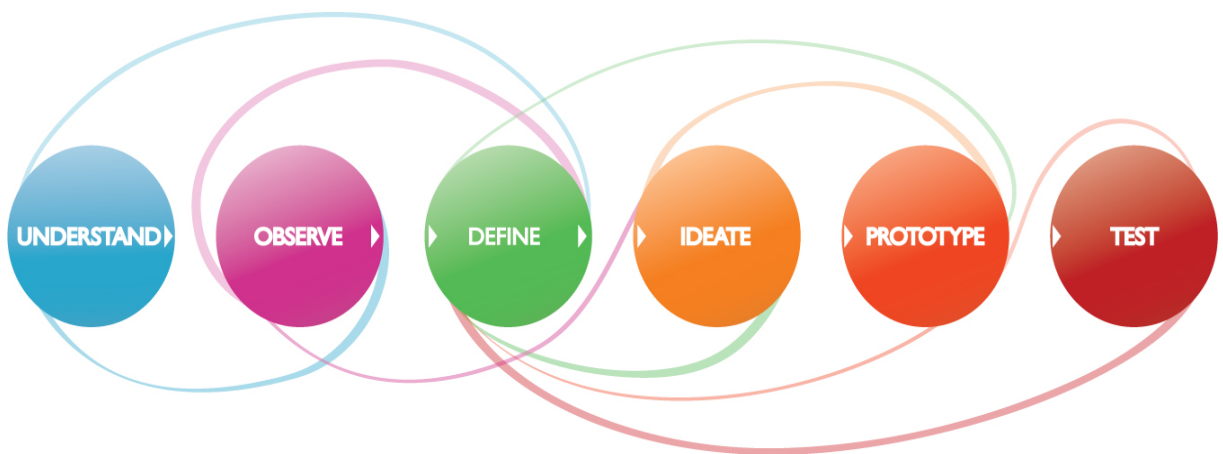
How does *d.mindset* apply to academic research?

Innovative scientists and interdisciplinary scholars use innovation methods that are familiar to designers, but rarely pay explicit attention to the process of how their ideas developed. Without explicit models or methods for the challenging process of generating innovative research ideas, replicating the creativity of experienced scientists can be difficult for emerging interdisciplinary researchers.

We propose that giving focused attention to innovation methods from the design thinking model can help graduate students improve their ability to create quality research. Specifically, the Stanford d.school's methodology of teaching innovation as a cyclical process that can be followed and gradually mastered will benefit graduate students by giving them tools that allow systematic application of creativity in their own research development.

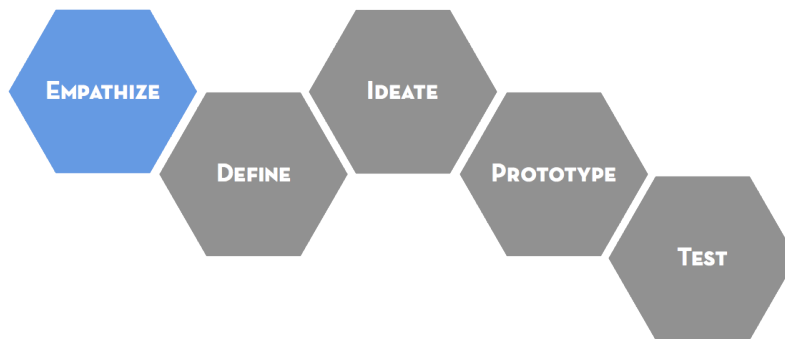
These innovation tools, such as ideation and prototyping, are especially applicable in interdisciplinary research for two reasons. First, design thinking methodology was explicitly developed to work in cross-disciplinary teams such as those that interdisciplinary scholars often find themselves working in. Second, interdisciplinary scholarship tends to be focused on solving complex applied problems, which are the very types of challenges for which design methodologies were originally developed.

The **modes of design thinking** process presented below are described in more detail on the following pages.



MODE

Empathize



WHAT is the empathize mode

Empathy is the foundation of a human-centered design process. To empathize, we:

- **Observe.** View users and their behavior in the context of their lives.
- **Engage.** Interact with and interview users through both scheduled and short 'intercept' encounters.
- **Immerse.** Experience what your user experiences.

WHY empathize

As a human-centered designer you need to understand the people for whom you are designing. The problems you are trying to solve are rarely your own—they are those of particular users; in order to design for your users, you must build empathy for who they are and what is important to them.

Watching what people do and how they interact with their environment gives you clues about what they think and feel. It also helps you to learn about what they need. By watching people you can capture physical manifestations of their experiences, what they do and say. This will allow you to interpret intangible meaning of those experiences in order to uncover insights. These insights will lead you to the innovative solutions. The best solutions come out of the best insights into human behavior. But learning to recognize those insights is harder than you might think. Why? Because our minds automatically filter out a lot of information in ways we aren't even aware of. We need to learn to see things "with a fresh set of eyes" – tools for empathy, along with a human-centered mindset, is what gives us those new eyes.

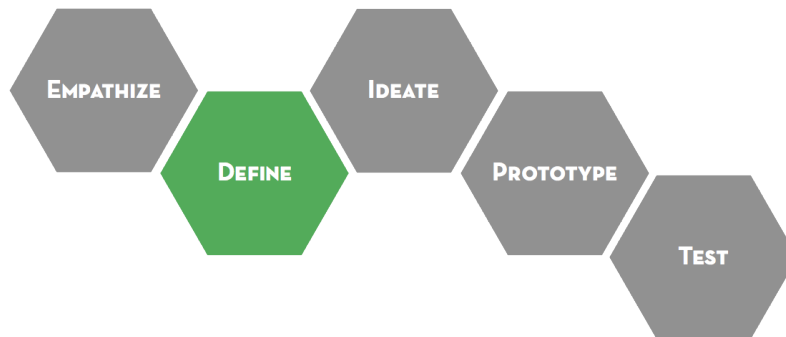
Engaging with people directly reveals a tremendous amount about the way they think and the values they hold. Sometimes these thoughts and values are not obvious to the people who hold them. A deep engagement can surprise both the designer and the designee by the unanticipated insights that are revealed. The stories that people tell and the things that people say they do—even if they are different from what they actually do—are strong indicators of their deeply held beliefs about the way the world is. Good designs are built on a solid understanding of these kinds of beliefs and values. Engage to:

- Uncover needs that people have which they may or may not be aware of
- Guide innovation efforts
- Identify the right users to design for
- Discover the emotions that guide behaviors

In addition to speaking with and observing your users, you need to have personal experience in the design space yourself. Find (or create if necessary) experiences to immerse yourself to better understand the situation that your users are in, and for which you are designing.

MODE

Define



WHAT is the define mode

The define mode is when you unpack and synthesize your empathy findings into compelling needs and insights, and scope a specific and meaningful challenge. It is a mode of “focus” rather than “flaring.” Two goals of the define mode are to develop a deep understanding of your users and the design space and, based on that understanding, to come up with an actionable problem statement: **your point of view**. Your point of view should be a guiding statement that focuses on specific users, and insights and needs that you uncovered during the empathize mode.

More than simply defining the problem to work on, your point of view is your unique design vision that you crafted based on your discoveries during your empathy work. Understanding the meaningful challenge to address and the insights that you can leverage in your design work is fundamental to creating a successful solution.

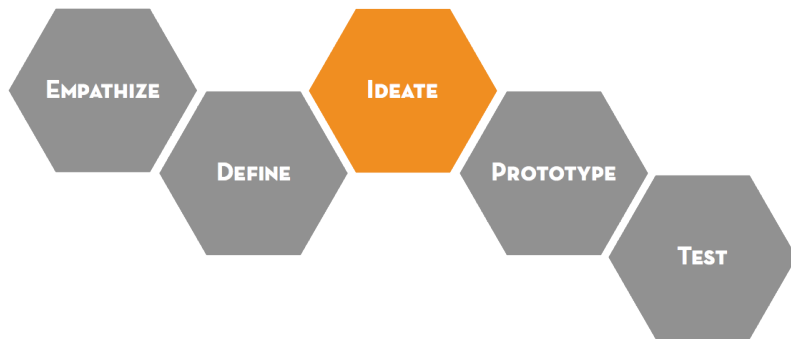
WHY define

The define mode is critical to the design process because it explicitly expresses the problem you are striving to address through your efforts. In order to be truly generative, you must first craft a specific and compelling problem statement to use as a solution-generation springboard.

As a test, a good point of view (POV) is one that:

- Provides focus and frames the problem
- Inspires your team
- Provides a reference for evaluating competing ideas
- Empowers your team to make decisions independently in parallel
- Fuels brainstorms by suggesting “how might we” statements
- Captures the hearts and minds of people you meet
- Saves you from the impossible task of developing concepts that are all things to all people
- Is something you revisit and reformulate as you learn by doing
- Guides your innovation efforts.

MODE Ideate



WHAT is the ideate mode

Ideate is the mode during your design process in which you focus on idea generation. Mentally it represents a process of “going wide” in terms of concepts and outcomes—it is a mode of “flaring” rather than “focus.” The goal of ideation is to explore a wide solution space – both a large quantity of ideas and a diversity among those ideas. From this vast depository of ideas you can build prototypes to test with users.

WHY ideate

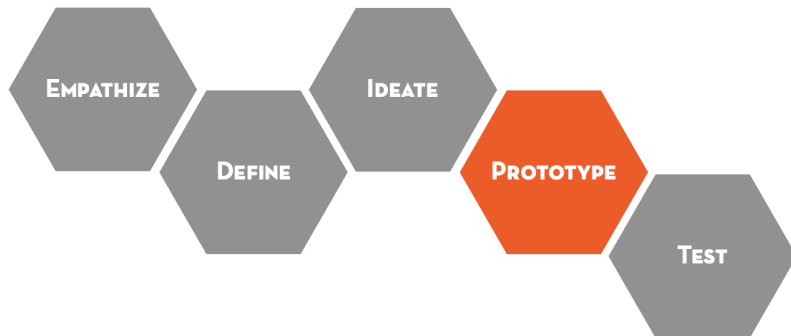
You ideate in order to transition from identifying problems into exploring solutions for your users. Various forms of ideation are leveraged to:

- Step beyond obvious solutions and thus increase the innovation potential of your solution set
- Harness the collective perspectives and strengths of your teams
- Uncover unexpected areas of exploration
- Create fluency (volume) and flexibility (variety) in your innovation options
- Get obvious solutions out of your heads, and drive your team beyond them

Regardless of what ideation method you use, the fundamental principle of ideation is to be cognizant of when you and your team are generating ideas and when you are evaluating ideas – and mix the two only intentionally.

MODE

Prototype



WHAT is the prototype mode

Prototyping is getting ideas and explorations out of your head and into the physical world. A prototype can be *anything* that takes a physical form – be it a wall of post-it notes, a role-playing activity, a space, an object, an interface, or even a storyboard. The resolution of your prototype should be commensurate with your progress in your project. In early explorations keep your prototypes rough and rapid to allow yourself to learn quickly and investigate a lot of different possibilities.

Prototypes are most successful when people (the design team, the user, and others) can experience and interact with them. What you learn from those interactions can help drive deeper empathy, as well as shape successful solutions.

WHY do we prototype

Traditionally prototyping is thought of as a way to test functionality. But prototyping is used for many reasons, including these (non-mutually-exclusive) categories:

- **Empathy gaining:** Prototyping is a tool to deepen your understanding of the design space and your user, even at a pre-solution phase of your project.
- **Exploration:** Build to think. Develop multiple solution options.
- **Testing:** Create prototypes (and develop the context) to test and refine solutions with users.
- **Inspiration:** Inspire others (teammates, clients, customers, investors) by showing your vision.

Many of the goals of prototyping are shared across all four of the above categories.

We prototype to:

To learn. If a picture is worth a thousand words, a prototype is worth a thousand pictures.

To solve disagreements. Prototyping is a powerful tool that can eliminate ambiguity, assist in ideation, and reduce miscommunication.

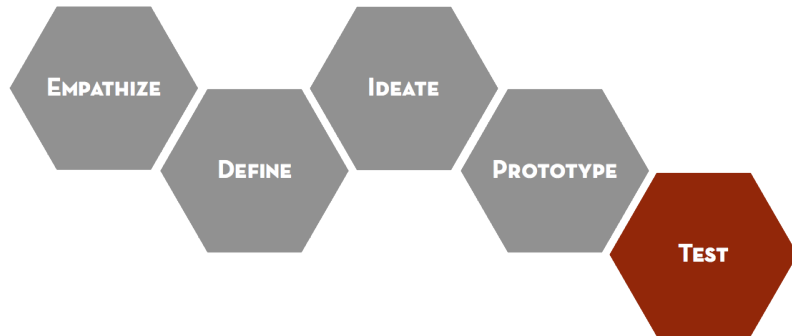
To start a conversation. A prototype can be a great way to have a different kind of conversation with users.

To fail quickly and cheaply. Creating quick and dirty prototypes allows you to test a number of ideas without investing a lot of time and money up front.

To manage the solution-building process. Identifying a variable to explore encourages you to break a large problem down into smaller, testable chunks.

MODE

Test



WHAT is the test mode

Testing is the chance to refine our solutions and make them better. The test mode is another iterative mode in which we place our low-resolution artifacts in the appropriate context of the user's life. Prototype as if you know you're right, but test as if you know you're wrong.

WHY test

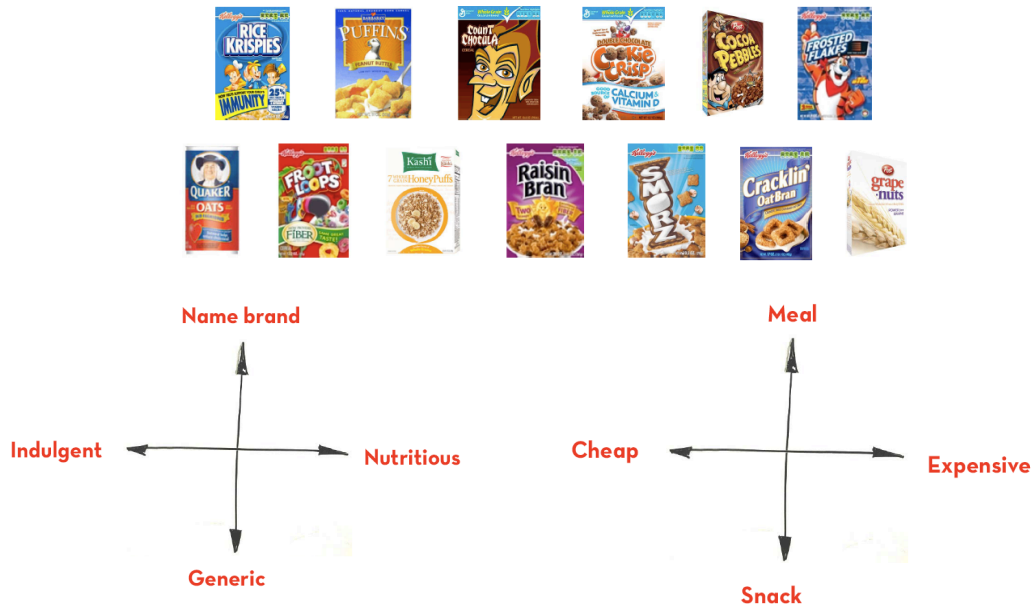
To refine our prototypes and solutions. Testing informs the next iterations of prototypes. Sometimes this means going back to the drawing board.

To learn more about our user. Testing is another opportunity to build empathy through observation and engagement—it often yields unexpected insights.

To test and refine our POV. Sometimes testing reveals that not only did we not get the solution right, but also that we have failed to frame the problem correctly.

METHOD

2x2 Matrix



WHY use a 2x2 matrix

A 2x2 matrix is a tool to scaffold thinking and conversation about your users and problem space. Use it during your synthesis process to help you think about relationships between things or people. The hope is that insights or areas to explore more deeply will come out from using a 2x2. 2x2 matrices are also a great way to visually communicate a relationship you want to convey.

HOW to use a 2x2 matrix

Pick two spectra (one on each axis), draw a 2x2 matrix, and plot items in the map. The items could be product, objects, motivations, people, quotes, materials – any group of things that would be useful to explore. Put opposites on either end of each axis. For example, you might place different people on a matrix of passion for their career (low-to-high) vs. technology adoption (early-adopter-to-late-adopter). Look for relationships by seeing where groups start to form. See what quadrants are very full or empty; where does the assumed correlation break down? The discussion that is spurred by trying to place items on the matrix is often more valuable than producing the map itself. You may need to try a number of combinations of spectra to get one that is meaningful and informative. Try some combinations, even if you are not sure which is right – the first attempts will inform the ones to follow.

One common use for a 2x2 matrix is a competitive landscape. In this case, an empty quadrant could signal a market opportunity (or a very bad idea).

METHOD

Powers of Ten

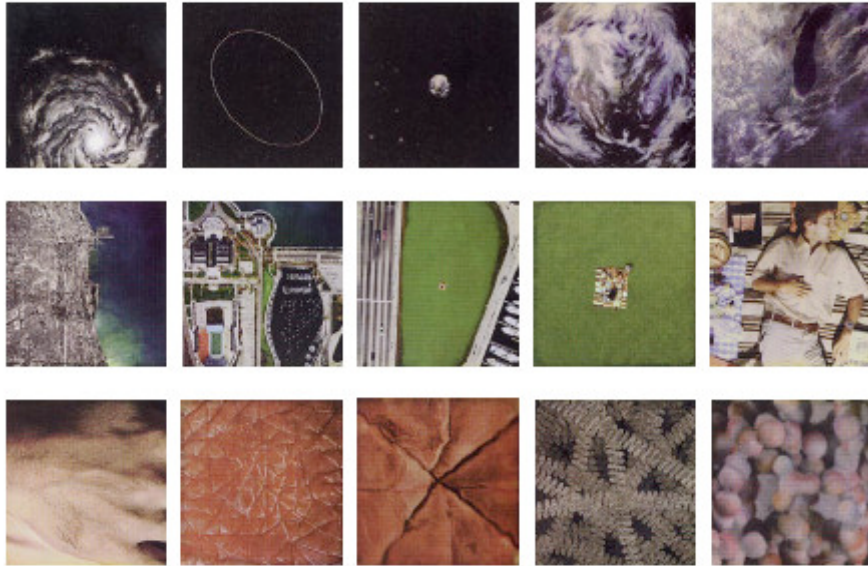


Image: Charles and Ray Eames, www.powersof10.com

WHY use powers of ten

Powers of Ten is a reframing technique that can be used as a synthesis or ideation method. It allows the design team to use an intentional approach to considering the problem at varied magnitudes of framing.

HOW to use powers of ten

The concept of Powers of Ten is to consider one aspect over increasing and decreasing magnitudes of context. Let's take two examples to illustrate how Powers of Ten could be used during a design process:

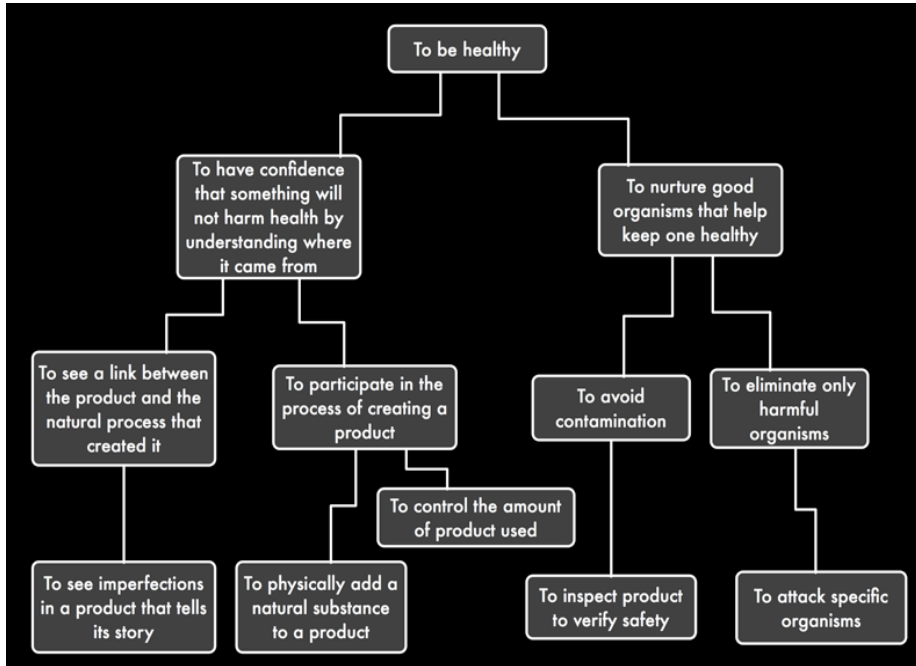
POWERS OF TEN FOR INSIGHT DEVELOPMENT: In this example, imagine you are designing a checkout experience, and you are trying to understand a user's motivation and approach to an aspect of her life. You are thinking about how she makes buying decisions. You made the observation that she read a number of customer reviews before making a purchase and are developing an insight that she values her peers' opinions when making purchases. Consider what her behavior might be for buying various items over a wide range of costs, from a pack of gum, to a pair of shoes, to a couch, to a car, to a house. Capture this in writing. Probe for nuances in your insight and see where it breaks down. Perhaps this could develop into a framework, such as a 2x2 (see the 2x2 Matrix method card).

POWERS OF TEN FOR IDEATION: During brainstorming groups idea generation lulls from time to time. One way to facilitate new energy is to use Powers of Ten. Continue with your brainstorming topic, but add a constraint that changes the magnitude of the solution space. "What if it had to cost more than a million dollars to implement?," "What about under 25 cents?," "What if it was physically larger than this room?," "Smaller than deck of cards?," "Had no physical presence?," "Took more than four hours to complete the experience?," "Less than 30 seconds?," More power to you.

Watch the Powers of ten video <http://www.allthingsscience.com/video/42/Powers-of-Ten>

METHOD

Why-How Laddering



WHY why-how ladder

As a general rule, asking 'why' yields more abstract statements and asking 'how' yields specific statements. Often times abstract statements are more meaningful but not as directly actionable, and the opposite is true of more specific statements. That is why you ask 'why?' often during interviews – in order to get toward more meaningful feelings from users rather than specific likes and dislikes, and surface layer answers. Outside an interview, when you think about the needs of someone, you can use why-how laddering to flesh out a number of needs, and find a middle stratum of needs that are both meaningful and actionable.

HOW to why-how ladder

When considering the needs of your user, start with a meaningful one. Write that need on the board and then ladder up from there by asking 'why'. Ask why your user would have that need, and phrase the answer as a need. For example, "Why would she 'need to see a link between a product and the natural process that created it'? Because she 'needs to have confidence that something will not harm her health by understanding where it came from'." Combine your observations and interviews with your intuition to identify that need. Then take that more abstract need and ask why again, to create another need. Write each on the board above the former. At a certain point you will reach a very abstract need, common to just about everyone, such as the 'need to be healthy'. This is the top of that need hierarchy branch.

You can also ask 'how' to develop more specific needs. Climb up ('why?') and down (how?) in branches to flesh out a set of needs for your user. You might come up to one need and then come back down. In the previous example, you climbed up to the 'need to understand where a product came from'. Then ask 'how' to identify the 'need to participate in the process of creating a product'. There will also be multiple answers to your 'whys' and 'hows' – branch out and write those down. The result (after some editing and refining) is a needs hierarchy that paints a full picture of your user or composite user. Alternatively, you can use this tool to hone in on one or two particularly salient needs.

Critical Reading Checklist

Critical Reading Checklist

- 1.) What's the point?
- 2.) Who says?
- 3.) What's new?
- 4.) Who cares?

WHY use a critical reading checklist

The Checklist is a tool used to determine whether a team has arrived at a meaningful, unique Point of View (POV). The original "Critical Reading Checklist" tool was developed by David Larabee, of the Stanford School of Education, and repurposed in the context of a design process to evaluate POVs.

Use this Checklist to ensure that your team's POV is valid, insightful, actionable, unique, narrow, meaningful, and exciting. While this method is not in itself sufficient to address the deficiencies of a POV, it is a great tool to think through and evaluate the usefulness of the POV.

HOW to use a critical reading checklist

We ask ourselves four basic questions about our Point of View:

1. **What's the point?** – What is your team's angle?
 - What is your team's framework in stating a POV?
 - Is it User-centered, Need-based, and Insight-driven?
2. **Who says?** – How valid is your team's POV?
 - Is your position supported by findings from users?
 - Is it a distillation of findings? Is this applicable outside of one colorful interview?
3. **What's new?** – What is the value-add of your POV?
 - Have you articulated your findings in a new way?
 - Are they placed in the context of a user?
 - If your POV doesn't feel new, try being more specific.
4. **Who cares?** – How is your POV significant?
 - Your team should be excited at this point!
 - Is this work *worth doing*? If not, ask yourself why?
 - Reframe/rephrase until you get it right.

METHOD

“How Might We” Questions



How Might We...?

WHY create how might we questions

“How might we” (HMW) questions are short questions that launch brainstorms. HMWs fall out of your point-of-view statement or design principles as seeds for your ideation. Create a seed that is broad enough that there are a wide range of solutions but narrow enough that the team has some helpful boundaries. For example, between the too narrow “HMW create a cone to eat ice cream without dripping” and the too broad “HMW redesign dessert” might be the properly scoped “HMW redesign ice cream to be more portable.” It should be noted, the the proper scope of the seed will vary with the project and how much progress you have made in your project work.

HOW to generate how might we questions

Begin with your Point of View (POV) or problem statement. Break that larger challenge up into smaller actionable pieces. Look for aspects of the statement to complete the sentence, “How might we...” It is often helpful to brainstorm the HMW questions before the solutions brainstorm. For example, consider the following POV and resulting HMW statements.

USER	+	NEED	+	INSIGHT
An overworked husband	(needs)	to feel good about recycling		When things pile up he feels behind. And ultimately the big pile on the curb feels more like generating waste than doing good

1. How to reduce the size of the recycling pile?
2. How to make the husband feel good about a big pile?
3. How to reduce the amount of work involved in gathering all the house piles?
4. How to eliminate overflowing recycling bins?
5. How to make the husband feel ahead of the game?
6. How to make the husband feel less overworked?
7. How to make recycling feel less like waste?

BRAINSTORM RULES

Defer Judgement - NO Blocking

METHOD

Facilitate a Brainstorm



WHY facilitate a brainstorm

Good facilitation is key to a generative brainstorm. You brainstorm to come up with many, wide-ranging ideas; a good facilitator sets the stage for the team to be successful doing this.

HOW to facilitate brainstorm

ENERGY – As the facilitator it is your task to keep the ideas flowing. Perhaps the most important aspect of a successful brainstorm is the seed question that you are brainstorming about (see the “How Might We” method card for more information). During the brainstorm keep a pulse on the energy of the group. If the group is slowing down or getting stuck make an adjustment. Create a variation to the “How-might-we?” (HMW) statement to get the group thinking in another direction (prepare some HMW options ahead of time). Or have a few provocative ideas in your back pocket that you can lob in to re-energize the team.

CONSTRAINTS – Add constraints that may spark new ideas. “What if it had to be round?,” “How would superman do it?,” “How would your spouse design it?,” “How would you design it with the technology of 100 years ago?” Additionally you can create process constraints. Try putting a time limit on each how-might-we statement; shoot for 50 ideas in 20 minutes.

SPACE – Be mindful about the space in which you conduct a brainstorm. Make sure that there is plenty of vertical writing area. This allows the group to generate a large number of potential solutions. Strike a balance between having a footprint that is big enough for everyone, but also is not so large that some people start to feel removed. A good rule of thumb is that all members of the group should be able to reach the board in two steps. Also, make sure each person has access to sticky notes and a marker so they can capture their own thoughts and add them to the board if the scribe cannot keep up with the pace. (See more about scribing on the “Brainstorming” method card.)

METHOD

Impose Constraints



WHY impose constraints

It is a bit counterintuitive, but imposing constraints with intention can actually increase your creative potential. Try it: Think of as many white things as you can in ten seconds. Now think of white things in your kitchen. Did the more constrained prompt spark more ideas?

HOW to impose constraints

There are many times throughout the design process when imposing constraints can help you be a more successful designer. However, being conscious of what filters you place on your design process, and when, is very important. Imposing a specific constraint on your idea generation is different than rejecting ideas because of pre-conceived notions of what you are trying to make.

Three areas where imposing constraints can be useful are in ideation, in prototyping, and with time:

IDEATION: During a brainstorm, or when you are ideating with a mindmap, temporarily add a constraint. This constraint might be “What if it were made for the morning?” or “How would McDonald’s do it?”. Keep this filter on the ideation for as long as it is useful. (For more, see the “Facilitate a Brainstorm” card.)

PROTOTYPING: In prototyping, particularly in early stages, you build to think. That is, you reverse the typical direction – of thinking of an idea and then building it – to using building as a tool to ideate. You can increase the output of this process by imposing constraints. Constrain your materials to push toward faster, lower resolution prototypes and increase the role of your imagination. Developing a checkout service? Prototype it with cardboard, Post-its and a Sharpie. Making a mobility device? Do it with cardboard, Post-its and a Sharpie. Designing an arcade game? Cardboard, Post-its, Sharpie.

Additionally, as with brainstorming, put constraints on the solution itself.

How might you design it . . . for the the blind? Without using plastic? Within the space of an elevator?

TIME: Create artificial deadlines to force a bias toward action. Make two prototypes in an hour.

Brainstorm intensely for 20 minutes. Spend three hours with users by the end of the weekend.

Develop a draft of your point-of-view by the end of the hour.

METHOD

Storytelling



WHY storytelling over other forms of communication

It seems stories are hard-wired into our psyche. People have been passing information along via storytelling for as long as humans have had a rich language to draw from. Stories are a great way to connect people with ideas, at a human level. A well-told story – focused on sharing pertinent details that express surprising meaning and underlying emotions – effects the emotions and the intellect simultaneously.

HOW to design a story

What's the point? Know what you intend to convey both narratively and emotionally. You should be able to describe the essence of the transformation of your character in one sentence & the tone of the story in a couple of words. Be able to articulate the emotional tone in a couple of words.

Be Authentic: Stories are more powerful when they include a little bit of you. Honest expression is stronger and more resonant than cliché.

Character-Driven: Characters are a great vehicle through which to express deep human needs and generate empathy and interest from your audience. Focus on character.

Dramatic Action: Your story should have 3 components: Action, Conflict, and Transformation.

Action: What is the character trying to do? What actions are they taking to achieve it?

Conflict: What is in her way? What questions linger beneath the surface?

Transformation: What is the big insight? How do the action & conflict resolve.

Details: "Behind all behavior lies emotion." What details can you share about your character and their situation that will suggest the emotions that lie beneath?

Design Process is a Built in Story: Use what you've learned during the design process. Empathy maps well to Character. Needs map to Conflict, Insights + Solutions map to Transformation.

METHOD

Stoke



photo: flickr/James Willamor

WHY stoke

Stoke activities help teams loosen up and become mentally and physically active. Use stoke activities when energy is wavering, to wake up in the morning, to launch a meeting, or before a brainstorm.

HOW to stoke

Do an activity that gets your creativity going and increases your team members' engagement with each other. A good stoke activity not only increases energy but also requires each person to actively engage, listen, think, and do. For example, when playing Pictionary you must watch a teammate drawing, listen to other teammates guessing the answer (allowing you to build on those ideas), think of what the answer might be, and call it out guesses yourself. Keep it brief (5-10 minutes) and active so you can jump into your design work after. Many improv games are good stoke activities. Try one of these:

Category, category, die! Line folks up. Name a category (breakfast cereals, vegetables, animals, car manufacturers). Point at each person in rapid succession, skipping around the group. The player has to name something in the category. If she does not, everyone yells "die!!" and that player is out for the round.

Sound ball Stand in a circle and throw an imaginary ball to each other. Make eye contact with the person you are throwing to, and make a noise as you throw it. The catcher should repeat the noise while catching, and then make a new noise as he throws to next person. Try to increase the speed the ball travels around the circle. Add a second ball to the circle to increase each person's awareness.

"Yes, Let's" Everyone walk around the room randomly, and then one person can make an offer: "Let's act like we're all at a cocktail party," "Let's be baby birds," or "Let's act like we don't understand gravity." Then everyone should shout in unison the response, "Yes, let's" and proceed to take the directive by acting it out. At anytime someone else can yell out the next offer. The answer is always, "Yes, let's!"

METHOD

I Like, I Wish, What If



WHY use I Like, I Wish, What if

Designers rely on personal communication and, particularly, feedback, during design work. You request feedback from users about your solution concepts, and you seek feedback from colleagues about design frameworks you are developing. Outside the project itself, fellow designers need to communicate how they are working together as a team. Feedback is best given with I-statements. For example, “I sometimes feel you don’t listen to me” instead of “You don’t listen to a word I say.” Specifically, “*I like, I wish, What if*” (IL/IW/WI) is a simple tool to encourage open feedback.

HOW to use I Like, I Wish, What if

The IL/IW/WI method is almost too simple to write down, but too useful not to mention. The format can be used for groups as small as a pair and as large as 100. The simple structure helps encourage constructive feedback. You meet as a group and any person can express a “Like,” a “Wish,” or a “What if” succinctly as a headline. For example you might say one of the following:

“I like how we broke our team into pairs to work.”

“I wish we would have met to discuss our plan before the user testing.”

“What if we got new team members up to speed with a hack-a-thon?”

The third option “What if. . .” has variants of “I wonder . . .” and “How to . . .”
Use what works for your team.

As a group, share dozens of thoughts in a session. It is useful to have one person capture the feedback (type or write each headline). Listen to the feedback; you don’t need to respond at that moment. Use your judgment as team to decide if you want to discuss certain topics that arise.

TEAM PROCESS

Guidelines for Effective Feedback by Julian Gorodsky

Guidelines for Effective Feedback

1. Feedback should either be solicited or given with agreement.
2. Feedback is MY perception and MY truth; it is not fact just because I believe it.
3. Feedback refers to specific, observable behavior.
4. Feedback should not relate to behavior or circumstances the receiver cannot control.
5. Feedback is most effective when it is timely.
6. Feedback relates to positive or negative perceptions of the receiver's behavior.
7. Feedback is non judgmental.
8. Feedback is not advice.
9. Feedback is a gift it becomes the property of the receiver.

The I-Statement

This simply suggests a means to preface your sharing of perceptions with the word "I". That means that you're sharing your stuff. Note the difference between the following two groups of statements. First, "You never listen to a word I say! You don't care if I'm even in this group!" Second, "I sometimes think you don't listen to me. It seems that you don't remember what I say. Is that true? I feel invisible to you, and I don't want to be." The first group places blame on the other person, while the second group, the "I" statements, express what the speaker is feeling.

Three Finger Feedback

Imagine pointing to the person you are giving feedback to, extending your index finger toward them. Now look at your hand, observing the direction your lower three fingers are pointing, back at you. This is a way to realize that we might think three times before giving feedback to another because it's more likely that the feedback is about you. If the perception you want to share passes this test, it is probably authentic feedback that will be easier to receive.

TEAM PROCESS

Why creative teamwork sucks by Bob Sutton

Creative work is sometimes portrayed as fun and teamwork sounds so soft and sweet. Yet working in creative teams sucks for many numerous well established reasons.

- **Interdependence is high.** It means that things don't come out the way you want them to...compromise sucks. I like it **my** way.
- **You never really know who is right.** Who has the greatest and the least expertise overall, let alone at any given time, is unclear. The more certain the work, the more rigid the status order is possible.
- Research on group dynamics, leadership, and prestige suggests that – independent of skill- **talkative and somewhat nasty people rise to the top** unless there are powerful counterforces. The "blabber mouth theory of leadership" and "brilliant but cruel" phenomenon explain who rises to the top. But can undermine team performance.
- **Disagreement sucks.** The best creative teams fight a lot, fighting can be no fun even when it is done right, it still makes people tense and hurts their feelings.
- **Criticism sucks-** especially when it happens to me! It is part of the creative process.
- **Creativity entails constant failure and setbacks,** even in the best teams and companies. Most new ideas are bad, old ideas are safer, but aren't creativity. People who do routine work are usually right; people who do creative work are usually wrong.
- **Wasting time sucks.** Teams are naturally slower, when there is uncertainty about direction and about who knows the most and least, it gets even worse. The creative process is naturally messy and uncertain, but what is the alternative?
- **You can do everything right and still be dead wrong.** No matter how much argument you do, how much data you gather, and how much testing you do, your creative ideal will likely be wrong. Most new companies, products, and technologies fail.

Despite all this, there are still creative teams that find ways to create great pleasure in the process. How? Focusing on the joys of the journey, framing things as positively as possible ("prototyping" is constant improvement not endless failure), curiosity, and mutual respect. And some people love the mess and interdependence-but not linear, conflict adverse, uncompromising loners.

From Bob Sutton's course on creating infectious action.

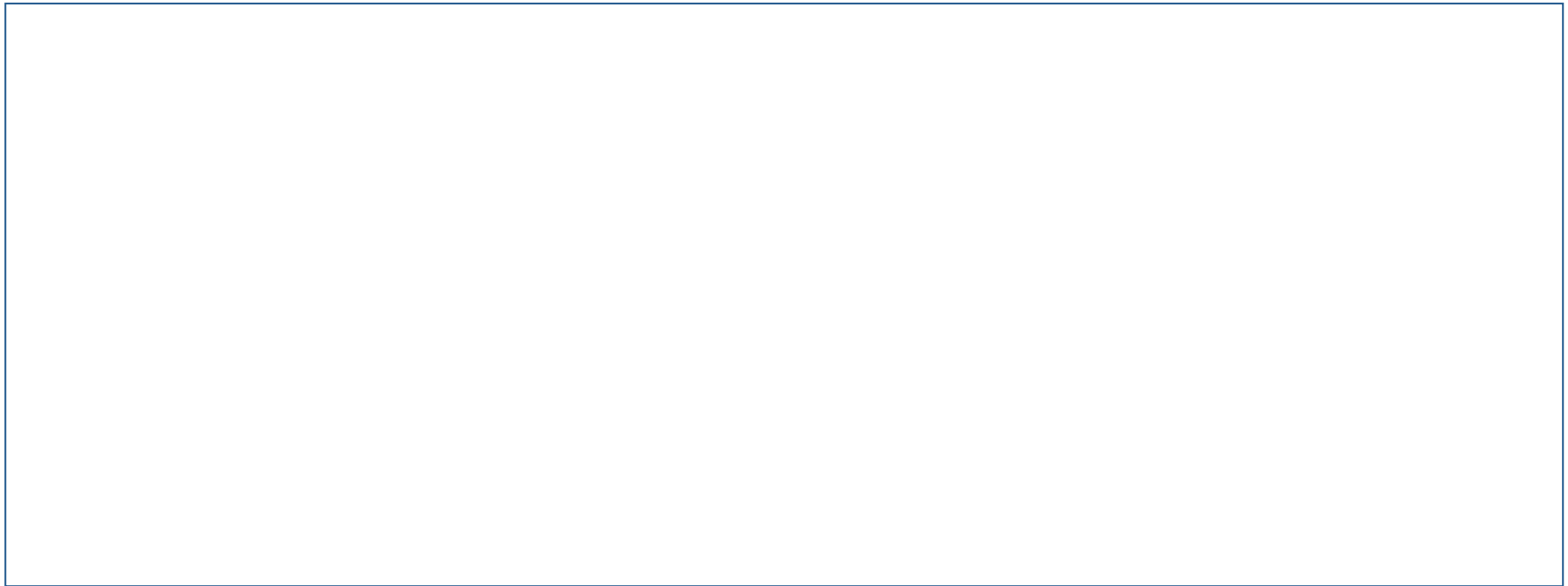
Research as Design workshop



WORKSHEETS

My research process

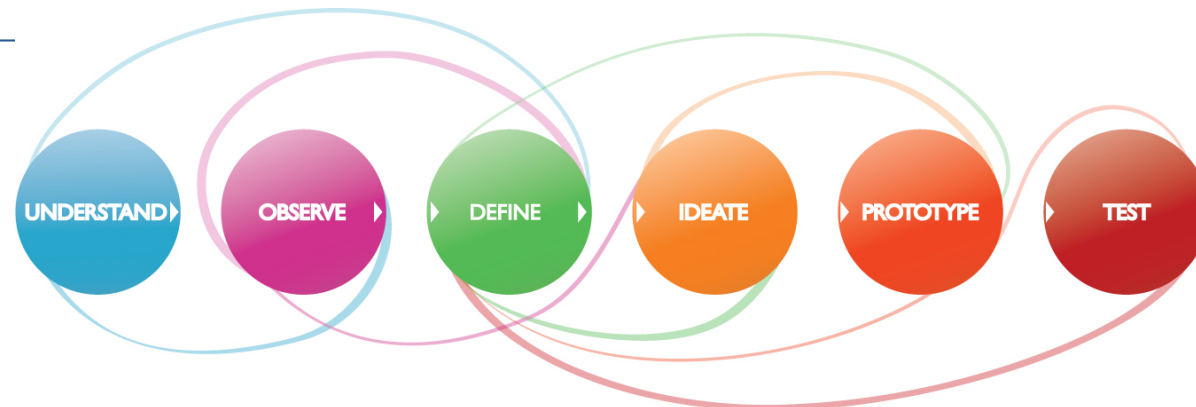
Draw and/or write out the steps you undertake to complete a research project.

A large, empty rectangular box with a thin blue border, intended for a student to draw or write out their research process. The box is currently blank.

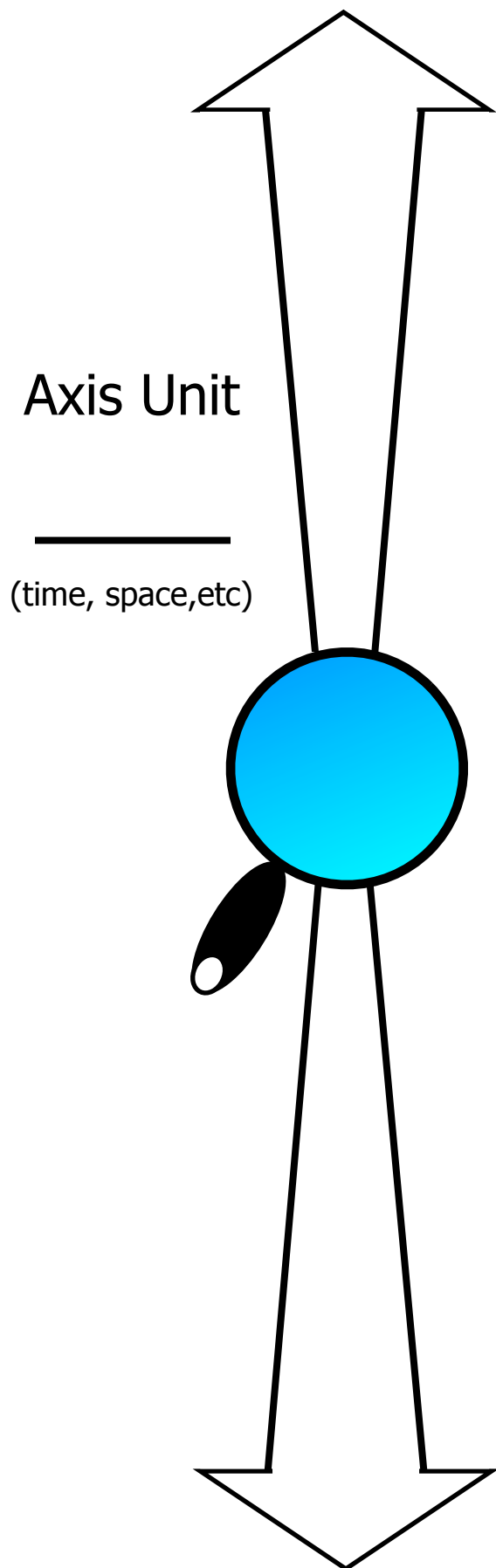
Paste colored stickers anywhere you think tools from the design thinking process could be useful.

Research and design process

Write the steps of your research process if/where they fit on the design process.



Powers of 10



x 10000

x 1000

x 100

x 10

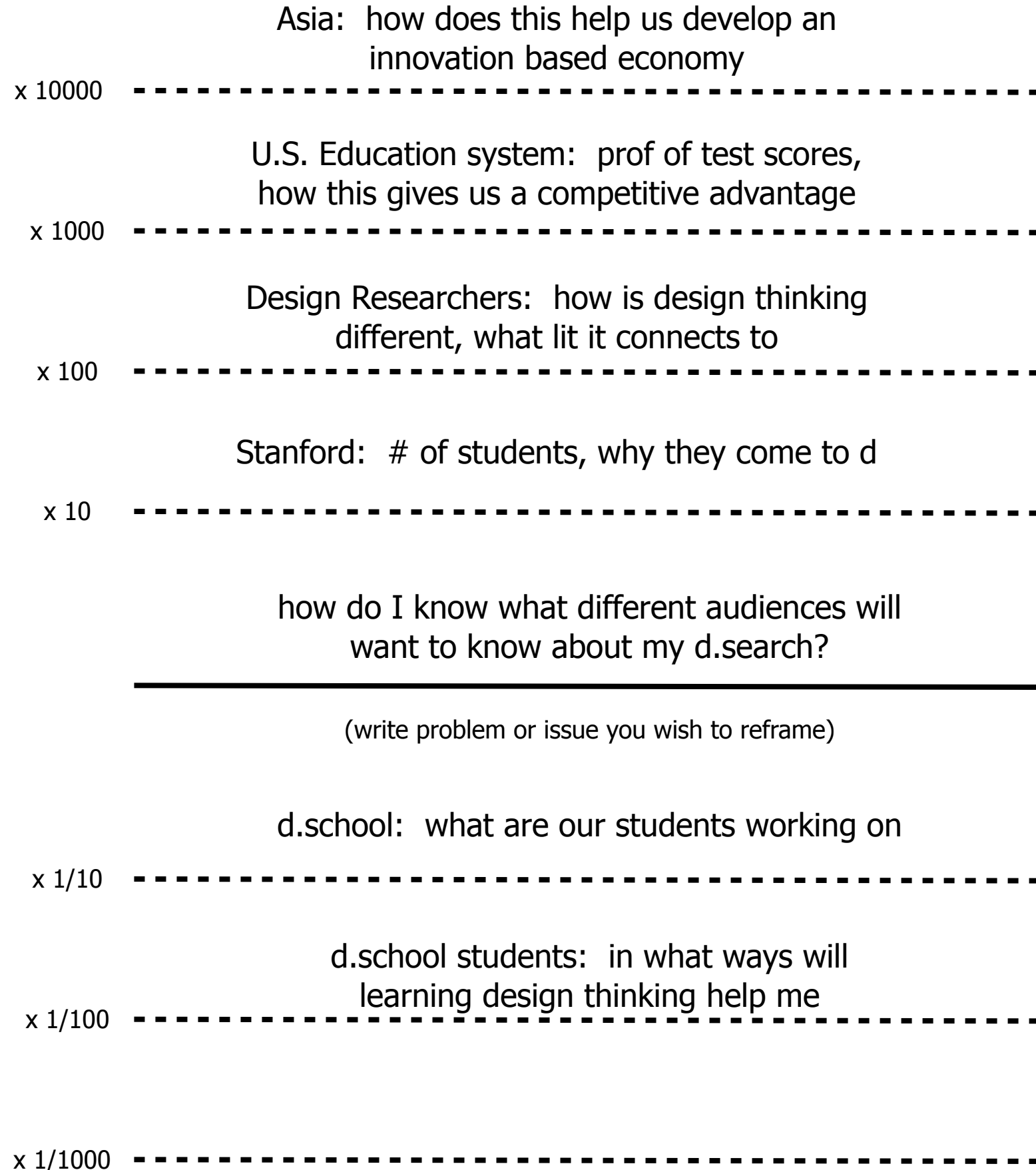
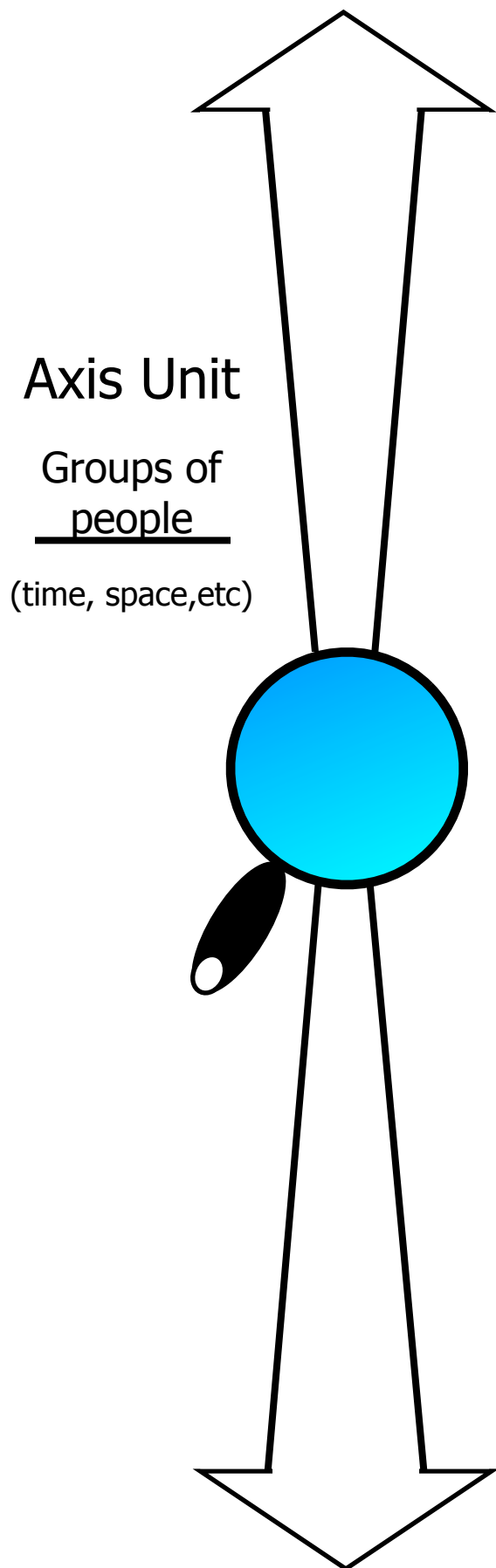
(write problem or issue you wish to reframe)

x 1/10

x 1/100

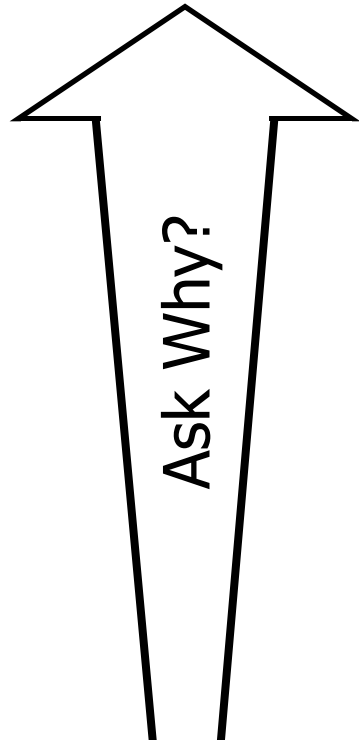
x 1/1000

Powers of 10

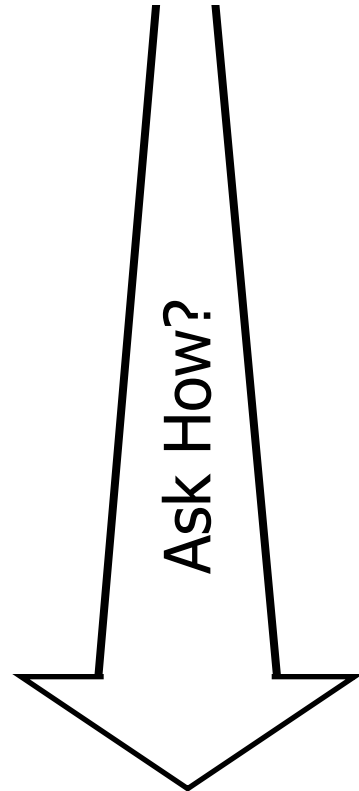


Why How Laddering

Higher Abstraction



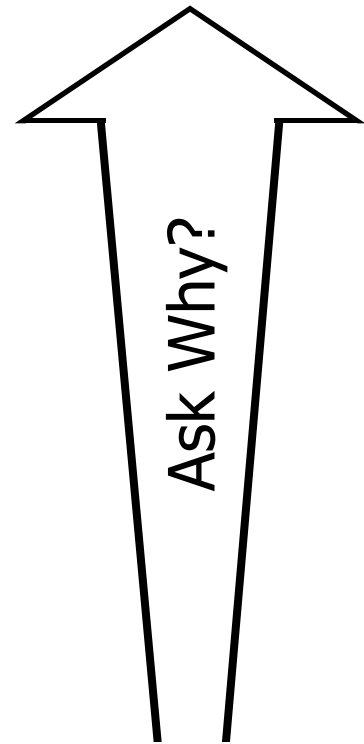
(write idea)



Lower Abstraction

Why How Laddering

Higher Abstraction



d.thinking experiences
alter students' values

(write idea)

why?

d.students are confronted
with a way of working that
challenges their assumptions

how?

d.school students being more
generative have more
opportunities to seem
themselves make creative leaps

why does
that matter?

d.school students have to be
more generative because more
failure is part of the game

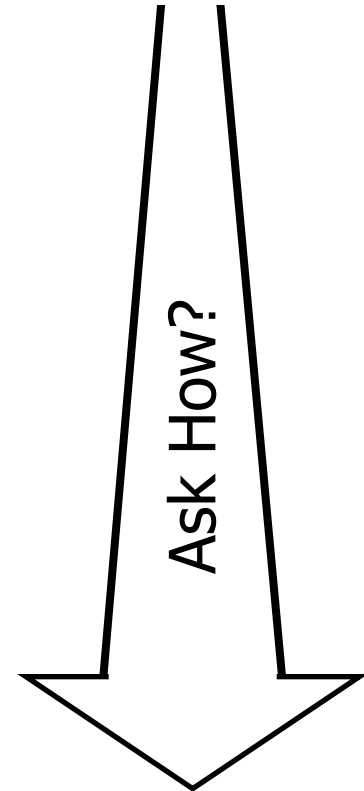
why does
that influence
students?

how does
this happen?

d.school doesn't give the
initial problem to solve and
forces high achievers to fail

teaching teams give such
ridiculous deadlines that failure
is certain

Ask How?



Lower Abstraction

Research as Prototyping

“...Prototypes provide the means for examining ~~design~~ **research** problems and evaluating solutions. Selecting the focus of a prototype is the art of identifying the most important open ~~design~~ **research** questions.”

-Houde and Hill, What do Prototypes Prototype?

The essence of the prototyping mindset is to approach everything you do a test, a chance to learn something new. With physical objects, this often means testing some aspect of the product's design in order to obtain feedback from users to inform decisions about how to build the product. With research, we could think of a whole range of activities as serving analogous functions. Essentially, any activity, conversation, or thing you write/present/produce that lets you answer the following question could be considered a prototype:

What do I need to know next to move forward (with this idea) or to make progress (in solving my current problem)?

To figure out what a useful research-focused prototype might look like, you could ask yourself:

How could I find the information I need to move forward in the quickest, easiest, simplest way possible?

The d.school prototyping mantra is “Fail early, fail often” The less time you take between iterations of your ideas and the more you seek people out to give you feedback, the quicker you'll make the inevitable mistakes or false starts you need to make on your way to eventual fantastic ideas.

(A FEW OF A MILLION POSSIBLE) EXAMPLES BASED ON THE THREE QUESTIONS TO HELP YOU CHOOSE WHAT TO PROTOTYPE

- Who will we show it to in what setting?
- What do we expect to learn?
- How will we evaluate that learning?

What the Prototype Is	Who Will I Show It To?	What Do I Expect To Learn?	How Will I Evaluate It?
Conversation with my advisor	Advisor	Whether or not my new idea for a dissertation topic is viable or not	How viable the idea is depends on how excited my advisor gets and how serious of objections she raises
Presentation to my lab group before an upcoming conference	Lab group	How well my new way of framing my research works for presenting to an audience of my peers	Does this framing of my work generate deeper questions than the previous way? Did anyone get lost or confused?
Two page written project brief	No one at first. I'm the initial audience of the first iteration.	Exactly what the details of the design for my new experiment look like and whether or not I can defend them against possible criticism	I will look at the logic of what I've written with my most critical eye. If I can't find major flaws, I will decide it passed the first test and plan a second prototype, probably showing it to someone else in my lab group.
Skit with a more senior graduate student to rehearse an important conversation with our mutual advisor	The other graduate student participating in the skit	Is my plan for how to bring up the difficult subject of how unhappy I am with my current research project the right one? Is there a more diplomatic way to frame the conversation?	I will ask the other student acting it out with me for his impressions about how well I've framed it. I trust he has a good sense of how our mutual advisor would react.
A practice session piloting the software I'm going to use to do interviews	Pilot session users (mostly friends I bribed with brownies or beer)	Do I understand how the software works? Am I fluent enough to operate it when I'm interviewing the important people I will really be using it with for my dissertation research?	I will be able to tell if I need more practice by how confident I feel with my friends and by the number of technical glitches (or lack thereof) during the dry run.

Research as Prototyping??

Recall... **THE MANY (NOT MUTUALLY EXCLUSIVE) REASONS WE PROTOTYPE**

- To gain empathy with users
- To explore, to help yourself think of more solutions
- To test and refine solutions
- To inspire others or illustrate your vision
- To solve disagreements
- To start a conversation with teammates or users
- To fail quickly and cheaply (by testing multiple solutions)
- without investing a lot of time and money up front.
- To manage the solution-building process. Identifying a variable to explore encourages you to break a large problem down into smaller, testable chunks.

Recall... **QUESTIONS TO HELP YOU CHOOSE WHAT TO PROTOTYPE**

- Who will we show it to in what setting?
- What do we expect to learn?
- How will we evaluate that learning?

Recall... **GOLDEN RULES OF PROTOTYPING**

1. One question, one prototype
2. Go far enough
3. Stop before it's perfect
4. Cannibalize as much as possible
5. Don't fall in love with your prototype
6. Always build and share more than one prototype
7. Create to provoke and persuade

“...Prototypes provide the means for examining ~~design~~ **research** problems and evaluating solutions. Selecting the focus of a prototype is the art of identifying the most important open ~~design~~ **research** questions.” -Houde and Hill, *What do Prototypes Prototype?*

What does a prototype of research look like? What forms could it take? Where did prototyping fit in your research/design mapping of your research process?

Are any of the research activities you did the past month prototypes? What would you have had to do differently to make them prototypes?

What the Prototype Is	Who Will I Show It To?	What Do I Expect To Learn?	How Will I Evaluate It?

Resources

Here you will find some additional resources on how to introduce design thinking mindset to your research.

Design thinking

Brown, T. (2008). Design thinking. Harvard Business Review, 86(6), 84-92.

Brown, T. & Katz, B. (2009). Change by design: How design thinking transforms organizations and inspires innovation. New York: Harper Business.

Beckman, S. L., & Barry, M. (2007). Innovation as a learning process: Embedding design thinking. California Management Review, 50(1), 25-56.

Junginger, S. (2007). Learning to design: Giving purpose to heart, hand and mind. Journal of Business Strategy, 28(4), 59-65.

Cross, N. (2006) Designerly Ways of Knowing
<http://www.amazon.com/Designerly-Ways-Knowing-Nigel-Cross/dp/1846283000>

Design thinking and research

McGuire, W. (1997) Creative Hypothesis Generating in Psychology: Some Useful Heuristics, Annual Review in Psychology

Heinze, T., Shaoira, P., Rogers, J., Senker, J. (2009) Organizational and institutional influences on creativity in scientific research, Research Policy, 38, p. 610-623

Craig, L. (1990) A Guide to Increased Creativity in Research- Inspiration or Perspiration? Bioscience, 40, 2, p.123

Resources on campus

Hasso Plattner Institute of Design (d.school)
<http://dschool.stanford.edu/>

- ME 216A: Advanced Product Design: Needfinding
- ME 377: Design Thinking Bootcamp: Experiences in Innovation and Design
- VPGE Summer College Adventures in Design Thinking
- IRITE, ISPEAK course <http://www.stanford.edu/group/i-rite/about.html>

Bootcamp reading list

<http://hci.stanford.edu/dschool/resources/readings/bootcamp-readings.pdf>

Problem finding and framing

Adams, J. L. (2001) Conceptual Blockbusting: A Guide To Better Ideas.
Designerly Ways of Knowing

Lave, C. A. and March, J. G. (1993) An Introduction to Models in the Social Sciences

Ideation/brainstorming

Swanson, S. A. (2010) Thinking outside of the toy box
<http://www.scientificamerican.com/article.cfm?id=toy-box-tech>

Prototyping

Bolker, J. and Hartman, V. (1998) Writing Your Dissertation in Fifteen Minutes a Day: A Guide to Starting, Revising, and Finishing Your Doctoral Thesis
Great source on using writing as a prototype and writing to think, not thinking to write.

Dow, S. P., Fortuna, J., Schwartz, D., Altringer, B., Schwartz, D. L. and Klemmer, S. R. (2011) Prototyping Dynamics: Sharing Multiple Designs Improves Exploration, Group Rapport, and Results, CHI: ACM Conference on Human Factors in Computing Systems

Tom Wujec on Marshmallow challenge at TED
http://marshmallowchallenge.com/TED_Talk.html

Storytelling

Schneider, S. (2009) Science as a Contact Sport: Inside the Battle to Save Earth's Climate

Beckman, S. L., & Barry, M. (2009). Design and innovation through storytelling. International Journal of Innovation Science, 1(4), 151-160.

IRITE, ISPEAK - SGSI course to develop a 2 minute version of your research

Multidisciplinarity

Brown, V. A., Harris, J. A., Russel, J. Y. (2010) Tackling Wicked Problems: Through the Transdisciplinary Imagination

Strober, M. (2010) Interdisciplinary Conversations: Challenging Habits of Thought

Teamwork

Team Dynamics by Julian Gorodsky (d.shrink) http://dschool.stanford.edu/projects/dteam_dynamics.php

Positive psychology <http://www.authentichappiness.sas.upenn.edu/Default.aspx>

Creativity

Amabile, T. M. (1997b). Motivating creativity in organizations: On doing what you love and loving what you do. *California management review*, 40(1), 39-58.

Alves, J., Marques, M. J., Saur, I., & Marques, P. (2007). Creativity and innovation through multidisciplinary and multisectoral cooperation. *Creativity and Innovation Management*, 16(1), 27-34.

Amabile, T. M. (1985). Motivation and creativity: Effects of motivational orientation on creative writers. *Journal of Personality and Social Psychology*, 48(2), 393-399.

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